IMPACTS OF ALTERNATIVE FARM POLICIES ON RURAL COMMUNITIES

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Abstract

The purpose of this study was to describe an LP/IO model for evaluating the economic impacts of alternative farm policies on rural communities and demonstrate its capabilities by analyzing the impacts of three farm policies on a rural community in Texas. Results indicate that in the noncrop sector, two groups of industries are most affected by farm policy. The first group relates to production directly (agricultural services, banking and credit, and nondurable manufacturing) and the second group relates to households (retail trade and services). Farm policies which reduce production but increase net returns cause losses for the first group while benefitting the second group. Both groups are made worse off by farm policies which reduce agricultural production and the value of output.

Key words: farm policy, rural communities, conservation reserve (CRP), mandatory supply controls, 1985 Farm Bill, LP/IO methods.

The 1985 Farm Bill went on record as being the most debated farm bill ever passed. Despite extensive analyses and debates related to this farm bill, there was little discussion of the bill's likely impacts on agriculturally dependent rural communities. The general rule has been to support the incomes of producers and thus support the economic base for rural communities. The impacts of farm policy on rural communities has not been analyzed extensively although the rural community literature is quite extensive.

Many of the studies relating agriculture and rural communities have focused on the relationship between farm structure in a region and the welfare and quality of life in the associated communities (Beaulieu and Mulkey; Goldschmidt; Hayes and Olmstead; Harris and Gilbert; Michaels and Marousek; Nuckton et al.; Shaffer et al.; Swanson and Skees; and U.S. Congress, Office of Technology Assessment). Sumner reported that despite an abundance of rhetoric, there is very little research in either applied economic theory or empirical analysis which has established any consistent link between farm programs, the structural characteristics of American agriculture, and rural communities.

As policy makers search for solutions to income and employment problems in both agriculture and rural communities, the importance of understanding and quantifying the effects of farm policy on rural communities is increased. Empirical research to quantify such relationships is particularly important to policy makers when agricultural and macroeconomic policies are being formulated and implemented.

The objective of this paper is to briefly describe a model for empirically analyzing the impacts of alternative farm policies on rural economies and demonstrate how it can be used to evaluate the impacts of the 1985 Farm Bill and two alternative farm policies on a rural region of Texas.

STUDY AREA

Terry County, in the Texas Southern High Plains, was selected for analysis. This county is located about 30 miles east of the Texas-New Mexico border. The county seat, Brownfield, is located 40 miles southwest of Lubbock. The county covers approximately 574,720 acres and had a population of 15,100 in 1982.

Growth and development of Terry County have been based primarily on agriculture and mining (oil and natural gas). Total employment in 1982 was 7,398, while personal income was

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$142 million (U.S. Department of Commerce 1984a). Agricultural production figures for 1984 indicate farmers in Terry County produced 151,800 bales of cotton, 1,256,600 bushels of sorghum, and 487,000 bushels of wheat on 355,000 harvested acres (Texas Field Crop Statistics). Total agricultural revenue, including farm program payments, in 1984 was $50.885 million (Texas County Statistics).

In 1982, the total number of farms in Terry County was 532 (U.S. Department of Commerce 1984b). Of these, 41 percent had less than $40,000 in gross sales, 34 percent had between $40,000 and $99,999, 20 percent had between $100,000 and $249,000, and 5 percent had sales over $250,000. In terms of area, 36 percent of the farms farmed fewer than 500 acres, 28 percent farmed between 500 and 999 acres, 26 percent farmed between 1,000 and 1,999 acres, and 10 percent farmed more than 2,000 acres. However, only 7 percent of the land was in farms of less than 500 acres, with 22 percent in 500- to 999-acre farms, 37 percent in 1,000- to 1,999-acre farms, and 34 percent in farms of greater than 2,000 acres.

The dependence of the county economy on agriculture is indicated by the fact that 27 percent of the employed population was directly involved in agriculture, 20 percent as either on-farm proprietors or laborers, with the remaining 7 percent employed in agricultural services. This compares to a state-wide average of less than 5 percent employed in agriculture (U.S. Department of Commerce, 1984a). The county is classified by USDA as a "farming important" county based on farm income over the 1980–84 period.

MODEL DESCRIPTION

To analyze the impacts of alternative farm policies on the economic activity and employment of Terry County, a model was developed which combines linear programming (LP) and input-output (IO) methods. The model is based on maximizing annual returns above variable costs in the crops sector of the economy subject to structural, policy, and IO balance equation constraints, while measuring the response of other sectors to intermediate demand. Output from the model is used to identify employment impacts resulting from farm policy changes.

Input-output models are general equilibrium models based on an accounting of the backward and forward linkages among sectors in an economy. IO analysis permits one to calculate the change in regional output and value added resulting from a given change in exogenous demand. In agricultural economics research, these models are often used to examine the economic interdependencies among agricultural sectors and nonagricultural sectors of an economy at regional as well as national levels (Heady and Sonka; Henry et al.; Johnson and Kulshreshtha; Michaels and Marousek; Stoeker et al.).

IO models can be incorporated into a linear programming framework (Everett and McCarl; Richardson, pp. 195–211). Such a combination adds flexibility to the use of IO models, allowing for capacity constraints and choice in the pattern of output. Interindustry linkages in the economy and the region's external trade pattern can be incorporated into the LP model by including the basic balance equations from the IO model as constraints (Henry and Bowen). The general structure of an LPIO model may be represented,

(1) Max/min CX

(2) subject to: $DX \leq R$ and

(3) $(I-A)X \geq Y$,

where C is an (1 x n) vector of objective function weights,

X is an (n x 1) vector of industry outputs,

D is an (m x n) vector of resource input coefficients,

R is an (m x 1) vector of resource limits,

I is an (n x n) identity matrix,

A is an (n x n) technical coefficients matrix, and

Y is an (n x 1) vector of final demands.

To account for the interindustry relationships, a closed nonsurvey input-output model of Terry County was developed. Closed IO models include the household sector as endogenous rather than as part of final demand (Miller and Blair, p. 25). In this study, a closed IO procedure was selected in an attempt to incorporate the linkage between earned farm income and consumption and between consumption and output.

Nonsurvey or partial survey methods facilitate creation of regional IO models from existing models. A large and inconclusive literature exists pertaining to the efficacy of nonsurvey versus survey methods, as well as of the various nonsurvey methods (Czamanski and Malizia; Lu; McManamin and Haring; Miller and Blair, pp. 266–316; Richardson,

pp.111–130; Schaffer and Chu). Given the significant time and financial costs of employing a survey IO approach and in spite of possible compromises in accuracy (Schaffer and Chu), the nonsurvey method of simple location quotients (SLQ) (Miller and Blair, p. 296) was employed in this study. The SLQ method has fared very well when compared to other forms of nonsurvey methods for creating regional IO models (McManamin and Haring; Miller and Blair, p. 302; Schaffer and Chu).

A modified version of an algorithm developed by Mustafa and Jones was used in applying the SLQ method to an existing 94-sector survey-based IO model of the Texas High Plains region (Stoeker et al.) to obtain a basic 22-sector IO model for Terry County (TCIO). The number of sectors was determined by the level of available employment data for the county (U.S. Department of Labor). Output or control totals in the nonagricultural sectors were determined using employment figures for the county and output-employment ratios for the region (Stoeker et al., pp. 44, 56). Agricultural sector control totals, including livestock, were estimated using 1985 production data (Texas County Statistics; Texas Field Crop Statistics; Texas Small Grain Statistics) and 1977 price data (U.S. Department of Agriculture, 1986). Prices for 1977 were used with 1985 employment and production levels to reflect the most recent physical output at price levels consistent with the Stoeker et al. model.

Following a procedure described by Henry (p. 43), the technical coefficients matrix was updated by adjusting for relative price changes between 1977 and 1985, and again for each year of the analysis. Historical indices (Economic Report of the President) were used through 1986, while projected prices (Knutson et al.) were used for 1987 through 1990.

To incorporate structural differences in agriculture for the county, the agricultural crop sectors in the TCIO model (irrigated and dryland cotton, irrigated and dryland wheat, and irrigated and dryland sorghum) were each disaggregated into four farm sizes. The disaggregation categories included small farms (0–499 acres), mid-sized farms (500–999 acres), large farms (1,000–1,999 acres), and very large farms (2000+ acres) for each of the crops. This procedure increased the number of agricultural sectors in the model from six to 24 (i.e., six major crops with four farm sizes for each).

The disaggregation involved scaling the elements in each agricultural column of the technical coefficients matrix by cost of production and price differences for the various farm sizes. Such differences were identified by Smith in a survey of farms in the region and subsequently used to construct budgets for the various sized farms. Column totals for each new agricultural sector were compared to the original and adjusted in the household row to reflect efficiency differences. For example, the column total of technical coefficients for the new, large, irrigated cotton farm is less than the original by a factor of 0.87. Hence, the technical coefficient for the household row in the large, irrigated cotton farm sector is increased by the difference to reflect an increase in profit.

Since a sector for the Conservation Reserve Program (CRP) does not exist in the Stoeker et al. model, a technical coefficient column for each of the farm sizes was approximated using the dryland wheat sector in conjunction with dryland wheat budgets (Texas Agricultural Extension Service) and adjusted to reflect more expensive seed but no harvesting and hauling expenses.

In summary, the technical coefficients matrix for the Terry County model includes 16 noncrop sectors and 28 agricultural sectors. This matrix is incorporated into the LPIO model by converting the agricultural sectors from a dollar-output to an acre-output basis while leaving the noncrop sector coefficients unchanged. By including only projected returns above variable costs for crop sectors in the objective function, the noncrop sector will produce only enough output to meet intermediate demand from the crop sector and thereby isolate the effects of agricultural policy changes.

In addition to the interindustry constraints contained in the technical coefficients matrix, 29 resource constraints were included to establish a realistic starting point for the model regarding: (a) total farmland and program base acreages, (b) acres by farm size, (c) irrigated land, and (d) conservation reserve acreage. Because no recursive relationships were developed in this study, resource constraints were gradually relaxed by one percent over the study period. While arbitrary, the rate was based on the average annual rate of land transfers in the region from 1983 to 1986 (Gilliland). Sensitivity analysis on land constraints showed only minor outcome differences up to a rate of ten percent.

Employment levels in the model were calculated using established output-employment ratios and estimates of sectoral output (Casey, p. 88; Kao, p. 27). Further details about the model are provided by Bowker.

POLICIES ANALYZED

Since the passage of the 1985 Farm Bill, numerous proposals to change the farm program have been debated by Congress. Mandatory supply controls have been proposed and analyzed to quantify their ability to enhance farm incomes while balancing production and demand (e.g., Young et al.; Knutson et al.; Food and Agricultural Policy Research Institute [FAPRI]; Kletke and Ray). Proposals to reduce government expenditures by reducing target prices and payment limitations have been analyzed as to their likely impacts on farm incomes (e.g., Knutson et al.; Dillier; Westhoff; Gerloff et al.; U.S. General Accounting Office). No studies, however, have evaluated the impacts of such proposals on the economic activity of rural communities. This omission occurred in spite of the fact that in 1984, roughly 700 of the 2,443 rural counties in the United States depended on farming for at least 20 percent of their income and employment (Green and Carlin).

For the present study, three proposed farm policies are analyzed using the Terry County LPIO model to quantify their impacts on a rural community. The policies analyzed are a continuation of the 1985 Farm Bill, a reduction in target prices, and a mandatory supply control program. Details regarding these proposals are presented below.

- The base policy was a continuation of the 1985 Farm Bill which is characterized by declining target prices and loan rates through 1990. Knutson et al. assumed that maximum acreage set-aside requirements would be implemented over the planning horizon, and that the Conservation Reserve Program (CRP) would enroll 50 million acres (Table 1).
- Alternative farm policy one was a 25-percent reduction in the target prices of wheat, cotton, corn, and sorghum for 1988–90 (Table 1). All other farm policy variables (loan rates and set-asides) in the base policy were held constant. This alternative was included because of continued interest in cutting target prices to reduce government spending.
- Alternative farm policy two was implementation of a mandatory supply management program for 1988–90. The policy alternative was designed to represent the Harkin Bill and would support domestic wheat, cotton, feedgrain, and soybean prices at 70 percent of parity in 1988 and at progressively higher prices through 1990 (Table 1). Export subsidies are provided to maintain market shares. Marketing certificates are used to prevent excess production from developing.

The impacts of these three policies on the production, prices, and consumption of cotton, wheat, and sorghum were estimated by Knutson et al. Their estimates of annual farm policy variables and crop prices were used to estimate the 1986–90 returns above variable costs for each crop by farm size for the objective function. Acreage constraints in the Terry County model were adjusted annually to reflect the acreage set-aside requirements for the particular farm policy being simulated.

All three farm policies were simulated assuming a continuation of the current macroeconomic environment characterized by high federal budget deficits and rapid growth in the money supply.[1] Knutson et al. project that under this macroeconomic policy, the annual inflation rate will gradually climb to 7 percent by 1990, real interest rates will climb to 8 percent, and real farm asset values and real net farm income will continue to decline through 1990.

RESULTS

The results of the analysis of the Terry County economy are presented in terms of net returns to agriculture, output for each crop sector, and output for each noncrop sector supporting agricultural output. In addition, employment levels supported by agriculture under the current farm bill and changes in employment for the two alternatives are compared.

1985 Farm Bill

The results in nominal dollars for a continuation of the 1985 Farm Bill are summarized in Table 2. Net returns to the crop sector in Terry County diminish steadily from $25.3 million (in 1986) to $14.3 million (in 1990) over the course of the 1985 Farm Bill. This is due to a gradual reduction of government price and income supports, particularly the target price which decreases 10 percent from 1986 to 1990. In addition, input prices are projected to rise annually at the rate assumed equal to the GNP

[1]Sensitivity of the results to the macroeconomic scenario was tested by assuming continuation of the 1985 Farm Bill and a macroeconomic environment characterized by a lower rate of growth in the money supply and tighter fiscal policy. Results of this analysis were nearly identical to the base policy scenario reported here. Total agricultural output averaged less than 1 percent more annually, but due to the slower growth in production costs, net returns to agriculture increased 5 percent. Slower increases in prices of nonagricultural goods translated to slightly slower nominal growth for sectors supplying inputs to agriculture. Retail and household sectors benefit (less than 1 percent over the study period) due to higher returns to agriculture.

TABLE 1. POLICY VARIABLES FOR CONTINUATION OF THE 1985 FARM BILL, A 25-PERCENT REDUCTION IN TARGET PRICES, AND THE HARKIN BILL

	1986	1987	1988	1989	1990
Continuation of 1985 Farm Bill					
Loan Rates					
Cotton ($/lb.)	0.55	0.525	0.50	0.50	0.50
Wheat ($/bu.)	2.40	2.28	2.17	2.06	1.95
Sorghum ($/bu.)	1.82	1.74	1.65	1.56	1.48
Target Prices					
Cotton ($/lb.)	0.81	0.794	0.77	0.745	0.729
Wheat ($/bu.)	4.38	4.38	4.29	4.16	4.00
Sorghum ($/bu.)	2.88	2.88	2.82	2.74	2.16
Set-aside Levels					
Cotton (fraction)	0.25	0.25	0.25	0.25	0.25
Wheat (fraction)	0.27	0.275	0.30	0.30	0.30
Sorghum (fraction)	0.20	0.20	0.20	0.20	0.20
Lower Target Prices[a]					
Target Prices					
Cotton ($/lb.)	0.81	0.794	0.578	0.559	0.547
Wheat ($/bu.)	4.38	4.38	3.22	3.12	3.00
Sorghum ($/bu.)	2.88	2.88	2.12	2.05	1.96
Harkin Bill[b]					
Loan Rates					
Cotton ($/lb.)	0.55	0.525	0.907	0.971	1.053
Wheat ($/bu.)	2.40	2.28	4.95	5.30	5.74
Sorghum ($/bu.)	1.82	1.74	3.43	3.67	3.98
Set-aside Levels					
Cotton (fraction)	0.25	0.25	0.282	0.318	0.284
Wheat (fraction)	0.27	0.275	0.33	0.33	0.33
Sorghum (fraction)	0.20	0.20	0.33	0.33	0.33

[a] Loan rates and set-aside value for continuation of the 1985 Farm Bill were used for the reduced target price scenario.

[b] The Harkin Bill did not provide for target prices.

deflator, and set-aside levels remained at 20 to 30 percent (Table 1). The estimated drop in net returns from 1986 to 1990 is about 43 percent in nominal dollars and 54 percent in constant 1986 dollars. Estimated gross output by the crop sector drops about 7 percent in nominal terms, from $73.7 million in 1986 to $68.4 million in 1990 (Table 2). These output figures include all government payments to producers (i.e., deficiency, marketing loan, Findley, and CRP).[2]

Nominal output from the noncrop sector in support of agricultural production averages $70.6 million over the 5-year period (Table 2). The general trend for total nonagricultural output follows that of the crop sector. This trend occurs despite the fact that prices in the noncrop sector are assumed to directly follow the upward trend of the GNP deflator. The drop in noncrop sector output is primarily due to decreased output from the household sector and, to a lesser extent, land entering the CRP.

The noncrop sector most influenced by changes in agricultural production and income is the household sector. This sector is endogenous and captures wages and profits resulting from all sectors and consequent secondary effects. Over the course of the 1985 Farm Bill, household sector output falls 10.7 percent from $45.5 million to $40.6 million under the 1985 Farm Bill (Table 2). This $5-million decline is primarily due to decreased net returns in the agricultural sector and thus lower retained earnings for farm families. The retail sector depends heavily on the household sector which explains the 7.4 percent decrease in retail sales.

[2]Output levels appear reasonable given that 1981–85 agricultural output for the county ranged from $51 to $89 million. In 1986, less than 0.5 percent of the county acreage was enrolled in the CRP; however, in 1987, approximately 10 percent of the acreage was enrolled in the CRP (USDA–ASCS). In the model, gross output resulting from CRP participation declines from $2.7 million to $1.9 million due to receiving the cover crop establishment subsidies in 1987 and 1988.

TABLE 2. TERRY COUNTY, TEXAS, CROP SECTOR AND SUPPORTING NONCROP SECTOR OUTPUT UNDER THE 1985 FARM BILL AND A HIGH BUDGET DEFICIT

	1986	1987	1988
		(Nominal $)	
Crop Sector ($1,000)			
Net return	25,343	24,530	23,506
Irrigated cotton	37,954	37,256	37,628
Irrigated wheat	895	867	852
Irrigated sorghum	773	794	845
Dryland cotton	28,763	28,152	28,587
Dryland wheat	1,087	1,079	1,142
Dryland sorghum	4,272	1,788	1,891
Conservation reserve	0	2,750	2,232
Total	73,746	72,690	73,180
Noncrop Sector ($1,000)			
Livestock	143	141	148
Agricultural services	7,506	7,685	8,319
Mining	1,453	1,441	1,511
Construction	21	21	32
Manufactured nondurables	3,261	3,221	3,383
Manufactured durables	200	198	203
Transportation	453	448	460
Communications	1,308	1,307	1,352
Utilities	801	804	838
Wholesale trade	1,460	1,421	1,461
Farm machinery and building supplies	424	428	446
Retail trade	3,978	3,911	3,961
Banking and credit	2,285	2,243	2,411
Insurance and real estate	626	632	667
Services	2,157	2,118	2,165
Households	45,484	44,633	44,930
Total	71,568	70,658	72,293

	1989	1990	Average 1986–90	Average 1988–90
		(Nominal $)		
Crop Sector ($1,000)				
Net return	18,831	14,330	21,308	18,889
Irrigated cotton	34,594	34,116	36,309	35,446
Irrigated wheat	834	813	852	833
Irrigated sorghum	865	831	822	847
Dryland cotton	28,672	28,356	28,506	28,538
Dryland wheat	1,160	1,146	1,123	1,149
Dryland sorghum	1,917	1,201	2,214	1,669
Conservation reserve	1,934	1,934	1,770	2,034
Total	69,979	68,400	71,599	70,520
Noncrop Sector ($1,000)				
Livestock	146	147	145	147
Agricultural services	8,639	9,231	8,276	8,730
Mining	1,504	1,527	1,487	1,514
Construction	36	38	30	35
Manufactured nondurables	3,384	3,435	3,337	3,401
Manufactured durables	203	208	203	205
Transportation	448	444	451	451
Communications	1,330	1,364	1,332	1,349
Utilities	823	837	821	833
Wholesale trade	1,439	1,439	1,444	1,446
Farm machinery and building supplies	443	463	441	450
Retail trade	3,788	3,682	3,864	3,810
Banking and credit	2,488	2,577	2,401	2,492
Insurance and real estate	667	683	655	672
Services	2,102	2,083	2,125	2,116
Households	42,433	40,620	43,620	42,661
Total	69,880	68,786	70,637	70,319

Agricultural services experience a 23-percent increase in nominal output from 1986 to 1990; however, in terms of 1986 dollars, the sector shows no growth (Table 2). Such a phenomenon can be explained by assumed annual nominal price increases in this sector. The manufactured nondurables sector also shows a nominal increase in output over the course of the 1985 Farm Bill; however, this, too, depends on the nominal price increases assumed in the study. The same is true for banking and credit.

Average annual crop sector employment for the 1985 Farm Bill in Terry County over the 1988 to 1990 period is estimated to be 1,202.5 (Table 3). This figure is consistent with data showing a decline in county agricultural employment from 1,497 in 1977 to 1,349 in 1984 (U.S. Department of Commerce, 1984a). The cotton sector accounts for 88 percent of the agricultural workforce. Employment in the noncrop sector resulting from output supporting agricultural production under the 1985 Farm Bill scenario averages 431.6 jobs per year from 1988 to 1990 (Table 3). This represents about 10 percent of the total private noncrop sector employment in Terry County during 1984 (U.S. Department of Commerce, 1984a). The bulk of noncrop sector employment stimulated by crop production (85 percent) is in the agricultural services, retail trade, services, and banking and credit sectors.

In summary, continuation of the current farm bill through 1990 leads to nominal decreases in economic activity for most sectors in the Terry County economy. Total crop sector output declines about 7.25 percent, and supporting noncrop sector output declines about 3.88 percent over the 1986–1990 period (Table 2). Households experience a 10.7-percent decline in income due primarily to the 43.5-percent decrease in crop sector net returns (Table 2).

TABLE 3. AVERAGE ANNUAL EMPLOYMENT BY TERRY COUNTY CROP PRODUCTION FROM 1988 TO 1990 UNDER CONTINUATION OF THE 1985 FARM BILL WITH DEVIATIONS IN EMPLOYMENT FROM THE BASELINE FOR A 25-PERCENT REDUCTION IN TARGET PRICES AND THE HARKIN BILL

	Continuation of 1985 Farm Bill (Base)	25-percent Lower Target Prices	Harkin Bill
	(no.)	— (Deviation from Base) —	
Crop Sector			
Irrigated cotton	590.57	-254.12	3.43
Irrigated wheat	17.64	13.93	17.21
Irrigated sorghum	27.56	1.06	11.37
Dryland cotton	470.34	93.41	-81.68
Dryland wheat	23.04	-4.47	-6.89
Dryland sorghum	42.14	-2.64	-3.58
Conservation reserve	31.34	0.00	0.00
Total	1202.52	-152.83	-60.14
Noncrop Sector			
Livestock	0.90	-0.21	0.12
Agricultural services	150.44	-23.56	-8.98
Mining	3.00	-0.72	0.37
Construction	0.46	-0.03	-0.01
Manufactured nondurables	11.64	-2.52	1.30
Manufactured durables	2.25	-0.50	0.11
Transportation	4.20	-1.23	0.75
Communications	15.51	-5.06	1.59
Utilities	3.56	-1.09	0.53
Wholesale trade	8.37	-2.18	1.12
Farm machinery and building supplies	7.98	-2.51	0.38
Retail trade	133.38	-44.45	30.86
Banking and credit	22.50	-2.81	0.13
Insurance and real estate	8.04	-1.85	0.79
Services	59.35	- 18.28	10.39
Total	431.59	- 106.98	39.45

Lower Target Prices

Reducing target prices 25 percent in 1988–90 for cotton, wheat, and sorghum results in a large decrease in crop sector output and net returns relative to the 1985 Farm Bill (Table 4). Physically, crop production is approximately the same as under the 1985 Farm Bill; however, the value of production declines due to lower target prices (deficiency payments). Over the 1988–90 period, average crop sector net returns fall 100.5 percent as total output falls 33.2 percent (Table 4). Irrigated cotton output declines the most (56.6 percent), while dryland cotton experiences an 8.8-percent decrease in output as more producers shift from irrigated to dryland cotton.

Under the reduced target price policy, output from the noncrop sector declined relative to the 1985 Farm Bill. Households are the most adversely affected, with a 36.4-percent decline (Table 4). The retail sector follows the household sector and experiences a 33.3-percent decline in output for 1988–90. Some important noncrop sectors (agricultural services, manufactured nondurables, and banking and credit) show smaller decreases in output compared to the 1985 Farm Bill scenario (Table 4). This result is due to these sectors being less affected by decreased net returns than other sectors, in the short run. In the longer run, as production declines, the output from these sectors will decline.

Reducing target prices for cotton, wheat, and sorghum by 25 percent in 1988–90 results in major employment losses for Terry County. Total crop sector employment declines by about 153 jobs or 12.7 percent from the 1985 Farm Bill scenario (Table 3). In the noncrop sector the total employment decline is 106.9 jobs, primarily in agricultural services, retail trade, and services.

TABLE 4. COMPARISON OF THE ECONOMIC IMPACTS ON TERRY COUNTY, TEXAS, OF CONTINUATION OF THE 1985 FARM BILL TO A 25-PERCENT REDUCTION IN TARGET PRICES AND TO THE HARKIN BILL, 1988–90

	1985 Farm Bill Average for 1988–90	25-percent Reduction of Target Prices	
		3-year Avg.	Change from Base
	($1,000)	($1,000)	%
Crop Sector			
Net return	18,889	-106	-100.5
Irrigated cotton	35,446	15,352	-56.6
Irrigated wheat	833	1,116	33.9
Irrigated sorghum	847	664	-21.6
Dryland cotton	28,538	26,006	-8.8
Dryland wheat	1,149	693	-39.6
Dryland sorghum	1,669	1, 180	-29.3
Conservation reserve	2,034	2,034	0.0
Total	70,520	47,047	-33.2
Noncrop Sector			
Livestock	147	112	-23.8
Agricultural services	8,730	7,362	-15.6
Mining	1,514	1, 150	-23.9
Construction	35	33	-5.7
Manufactured nondurables	3,401	2,663	-21.6
Manufactured durables	205	160	-22.0
Transportation	451	319	-29.1
Communications	1,349	909	-32.5
Utilities	833	577	-30.6
Wholesale trade	1,446	1,069	-26.0
Farm machinery and building supplies	450	309	-31.4
Retail trade	3,810	2,540	-33.3
Banking and credit	2,492	2,181	-12.4
Insurance and real estate	672	517	-23.0
Services	2,116	1,465	-30.7
Households	42,661	27,127	-36.4
Total	70,319	48,502	-31.0

TABLE 4. (CONTINUED)

Year Avg.	Harkin Bill	
		Change from Base
	($1,000)	(%)
Crop Sector		
Net return	32,020	85.3
Irrigated cotton	46,641	31.5
Irrigated wheat	2,118	154.1
Irrigated sorghum	1,623	91.5
Dryland cotton	30,851	8.1
Dryland wheat	1,037	-9.7
Dryland sorghum	2,071	24.0
Conservation reserve	2,034	0.0
Total	86,377	22.4
Noncrop Sector		
Livestock	167	13.7
Agricultural services	8,209	-5.9
Mining	1,698	12.1
Construction	35	-2.2
Manufactured nondurables	3,781	11.1
Manufactured durables	215	5.0
Transportation	531	17.7
Communications	1,487	10.2
Utilities	958	14.9
Wholesale trade	1,640	13.3
Farm machinery and building supplies	472	4.7
Retail trade	4,692	23.1
Banking and credit	2,506	0.5
Insurance and real estate	738	9.7
Services	2,487	17.5
Households	54,663	28.1
Total	84,284	19.8

Harkin Bill

The final farm program alternative analyzed is a mandatory supply control (Harkin Bill). This bill increases support prices to 70 percent of parity beginning in 1988 (Table 1). High support prices have been actively supported by farm sector advocates as a means of dealing with the farm credit crisis. Implementation of the Harkin Bill would provide an economic boost, at least in the four years analyzed, to the economy in Terry County (Table 4). Both the crop and noncrop sectors would experience large output increases compared to the 1985 Farm Bill (Importation of textiles produced with subsidized cotton exports would reduce the demand for U.S. textiles manufactured in several regions of the nation, so the benefits in Terry County would not transfer to all rural areas).

Total output for the crop sector averages 22.4 percent more than under the 1985 Farm Bill (Table 4). This output increase is primarily due to the large increase in prices of agricultural commodities because planted acreages of cotton, wheat, and sorghum decline due to increased set-aside levels (Table 1). The irrigated sectors show output increases between 31.5 and 154 percent (Table 4). The dryland sectors show smaller output increases, and wheat actually shows a 9.7-percent decrease in output relative to the 1985 Farm Bill scenario. These results indicate a trend toward increased irrigated acreage relative to dryland as crop prices increase. (This result agrees with Lee's finding for the larger High Plains region.)

The noncrop sector does not show quite as much increase in output as the crop sector. In fact, agricultural services and construction show decreases in average annual output of 5.9 and 2.2 percent, respectively (Table 4). Other sectors servicing crop production, such as manufactured nondurables and banking and credit, show small increases in output. These results are primarily due to the fact that most of the increase in crop sector output is due to commodity price increases (i.e., value more than volume). Input use by the crop sector remains relatively constant and may in fact drop because of increased set-aside acreage. The household and retail sectors show the most positive effects of the Harkin Bill on the non-

crop sector. Because of the increased net returns in agriculture and resulting profits to the household sector, households and retail trade show annual percentage output increases (28.1 and 23.1 percent, respectively) greater than the overall percentage output increase in the crop sector (22.4 percent) (Table 4).

Contrary to what might be expected by large increases in commodity prices and output under the Harkin Bill, employment in the crop sector is expected to decline by 60.1 jobs (Table 3). Most of this decline is attributed to decreased output in dryland cotton and increased set-aside levels. The increased profits to the crop sector are enough to stimulate an increase of 39.5 jobs in the noncrop sector relative to the 1985 Farm Bill. The majority of the new jobs are projected in the services and retail sectors. Because of the increased set-asides and only modest increases in crop yields, the agricultural services sector is expected to lose nine jobs relative to the Baseline (Table 3.)

SUMMARY AND CONCLUSIONS

The economic impacts of alternative farm policies on farm income, prices, and government costs were analyzed extensively prior to passing the 1985 Farm Bill. However, little or no analysis of farm policy impacts on rural communities was completed prior to passing the 1985 Farm Bill. The purpose of this study was to describe a model for evaluating the impacts of alternative farm policies on rural communities and demonstrate its capabilities by analyzing the impacts of alternative farm policies on a rural community in Texas.

An LPIO model was developed for Terry County, Texas. The model maximizes annual returns above variable costs in the crops sector of the economy subject to structural, policy, and IO balance equation constraints, while measuring the response of other sectors to intermediate demand. Output from the model is used to quantify employment impacts due to farm policy changes.

The three farm policies evaluated with the Terry County LPIO model are continuing the 1985 Farm Bill, reducing target prices, and introducing a mandatory supply control program. The lower target price scenario assumed 25-percent lower target prices for three years. The mandatory supply control assumed that target prices were replaced by support prices set at 70 percent of parity and that one-third of acreage was idled (i.e., the Harkin Bill).

Results of the model indicated that in the noncrop sector, two groups of industries are most affected by farm policy. The first group contributes to agricultural production directly. Included in this group are agricultural services, banking and credit, and nondurable manufacturing. As agricultural production and value of output decline under the 1985 Farm Bill, these sectors experience losses of greater proportion than other nonagricultural sectors. However, as long as production continues following current cultural practices, these sectors should remain economically viable, albeit at a somewhat reduced level of activity.

The second group of noncrop industries affected to a major degree by farm policy is the household-related sectors, including retail trade and services. These sectors are likely to continue their decline over the course of the 1985 Farm Bill. Such a conclusion is based upon the fact that as net returns in agriculture fall sharply, retained income to the household sector falls, and household spending is reduced.

Drastic changes in farm programs are likely to have major impacts on the Terry County economy. A sharp reduction in farm program benefits, like a 25-percent drop in target prices, would be felt by all sectors. Declining crop production, value of production, and net returns would be accompanied by declines in output from sectors providing inputs to agriculture and by sectors closely related to the household sector. Conversely, a sharp rise in program benefits exemplified by the Harkin Bill would render concentrated benefits. The significant increase in net returns in the crop production sector would enhance activity for households, retail trade, and services. The controls on the quantity of production in the Harkin Bill, on the other hand, negatively impact production-related industries.

The results presented here for Terry County may not be directly applicable to other rural counties in the United States. Much depends upon whether the crops in a given county are heavily supported by farm programs and whether the structural linkages in the economy embodied in the IO constraints are similar. If such conditions are met, then the impacts of farm program changes predicted for Terry County in this study should be representative. The analysis of the Terry County economy indicates that rural communities with large agricultural bases have a legitimate interest in farm policy decisions and that policy makers should explicitly consider the impacts of farm policy on rural communities.

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